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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,275	02/22/2001	Gunter Fuhr	A33828 PCT U	9406

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EXAMINER

NOGUEROLA, ALEXANDER STEPHAN

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/720,275

Applicant(s)

FUHR ET AL.

Examiner

ALEX NOGUEROLA

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35.U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 January 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-25, 29, 30, 38 and 39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 39 is/are allowed.
- 6) ☒ Claim(s) 20-25, 29, 30 and 38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Status of Objections and Rejections pending since the Office action of August 05, 2004***

1. The objection to the drawings is withdrawn.
2. All of the objections to the claims are withdrawn.
3. All rejections under 35 U.S.C. §102 are withdrawn.
4. All rejections under 35 U.S.C. §103 are withdrawn.

### ***Claim Objections***

5. Claims 20, 22, 24, 29 are objected to because of the following informalities:
  - a) Claim 20: in lines 4 and 6 “surfaces” should be -- surface --;
  - b) Claim 22: in line 2 “microelectrode~” should be -- microelectrodes --;
  - c) Claim 24, line 2: “microelectroques” should be -- microelectrodes --;
  - d) Claim 24, line 5: “microelectrodas” should be -- microelectrodes --; and
  - e) Claim 29, line 3: “being” should be -- are --.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

6. Claims 20-25, 29, 30, and 38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

- a) Claim 20, line 5: should “any-direction” be -- a y-direction -- (see (d) below)?
- b) Claim 20, line 6: -- on -- appears to be a more appropriate preposition than “with”;
- c) Claim 20 recites the limitation "the at least one microelectrode" in line 9. There is insufficient antecedent basis for this limitation in the claim;
- d) Claim 20 recites the limitation "the ... y-directions" in line 9. There is insufficient antecedent basis for this limitation in the claim;
- e) Claim 21: do the at least two microelectrodes of claim 21 include the at least one microelectrode of claim 20 or 39?
- f) Claim 22, line 3: --of—should be inserted between “barrier” and -- microelectrodes --;

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g) Claim 22 recites the limitation "the field barrier [[of]] the microelectrodes" in line 3.

There is insufficient antecedent basis for this limitation in the claim. In claim 20 the electrode arrangement generates the field barrier;

h) Claim 24, lines 2-3: are the two microelectrodes actually curved because of the flow profile?

i) Claim 24, lines 4-6: too many clauses linked with "to";

j) Claim 25 recites the limitation "whose field barrier" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim;

k) Claim 25 recites the limitation "on separate tracks" in line 5. There is insufficient antecedent basis for this limitation in the claim; and

l) Claim 29 recites the limitation "microelectrodes" in line 3. There is insufficient antecedent basis for this limitation in the claim. Claim 20 and 39 only require at least one microelectrode.

7. Note that dependent claims will have the deficiencies of base and intervening claims.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. Claims 20-24, 29, 38/20 are rejected under 35 U.S.C. 102(a) as being anticipated by Fiedler et al. ("Dielectrophoretic Sorting of Particles and Cells in a Microsystem," *Anal. Chem.* 1998, 70, 1909-1915).

Addressing claim 20, for the limitations of this claim see the abstract and Figure 1A, 2A, 2B, and Figures 5A-C.

Note (a) that the Figure 5 caption states that the electrodes shown are band electrodes ("A field funnel is formed by four band electrodes."), (b) parabolic or hyperbolic electrodes are shown in Figures 5A-C (see the Merriam-Webster onLine definitions of parabola and hyperbola), (c) that the field barrier has a corresponding parabolic or hyperbolic curvature may be inferred from Figure 6, which shows particles aligned with the outer surface of electrode in the lower left-hand corner of the figure.

Addressing claim 21/20, Figure 5A shows four electrodes on a cover surface wall and four electrodes on a bottom surface wall. All eight electrodes have curved portions.

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Addressing claim 22/21/20, at least two microelectrodes are shown in Figures 5A-C. The remaining limitations of the claim are intended use (“depending on a flow profile ...”) and desired result (“a resulting force ..”) that do not further structurally limit the microsystem.

Addressing claim 23/22/21/20, for the additional limitation of this claim see the caption to Figure 5C (“A field funnel is formed by four band electrodes.”).

Addressing claim 24/21/20, at least two microelectrodes are shown in Figures 5A-C. The remaining limitations of the claim are intended use (“depending on a flow profile ...”) and desired result (“describes a change in direction, which leads from ..”) that do not further structurally limit the microsystem.

Addressing claim 29/20, for the additional limitation of this claim see Figure 5A.

Addressing claim 38/20, for the additional limitations of this claim see Figures 5A-C. Note particularly Figure 5B, which shows a trapped microscopic particle, and Figure 5, which shows defected microscopic particles.

*Allowable Subject Matter*

10. Claims 25 and 30 would be allowable if rewritten to overcome the rejections under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. Claim 39 is allowed.

12. The following is a statement of reasons for the indication of allowable subject matter:

a) Claim 25 requires that the field barrier of the at least two microelectrodes acts in combination with the flow profile of the suspension liquid such that suspended particles with different passive electrical characteristics can pass the sorting electrodes on separate tracks depending on the characteristics of the suspend particles.

In Fiedler the microelectrodes in Figure 5 act as a funnel and a cage. Particles flowing from left to right are funneled into the cage bounded by the tips of the microelectrodes wherein selected particles are trapped while remaining particles in the liquid continue flowing to the right. Thus, Fiedler does not disclose passing the sorting electrodes on separate tracks, but in fact passing the sorting electrodes on a narrowed track;

b) Claim 30 requires the two microelectrodes to comprise different geometric shapes. In Fiedler the microelectrodes of Figure 5 have identical geometric shapes. It would not



have been obvious to have at least two of the microelectrodes have different geometric shapes as this would upset the symmetry of the cage field and depending on the difference in geometric shapes may even make a cage field difficult to form; and

c) Claim 39 requires the at least one microelectrode to comprise a multitude of straight electrode sections connected with each other, and in relation to the longitudinal extension of the channel, the straight electrode sections are arranged with predetermined, different angles and the field barrier has a parabolic or hyperbolic curvature relative to the x- and y- directions corresponding to the arrangement of the straight electrode sections.

Fiedler discloses a multitude of straight electrode sections connected with each other, and in relation to the longitudinal extension of the channel, the straight electrode sections are arranged with predetermined, different angles. See Figure 2B. However, the field barrier does not have a parabolic or hyperbolic curvature relative to the x- and y- directions corresponding to the arrangement of the straight electrode sections. As seen from Figures 3-6, which show movement of particles through the electrode system and thus suggests the shape of the field barrier, the field barrier initially has a funnel shape with straight sides, then forms a linear passage in the same direction as the longitudinal extension, and ends with a switch that forms a substantially linear barrier in one of two alternative directions.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEX NOGUEROLA whose telephone number is (571) 272-1343. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NAM NGUYEN can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alex Noguerola  
Primary Examiner  
AU 1753  
March 3, 2005